LAW OFFICES
DENNISON, SCHULTZ, DOUGHERTY & MACDONALD
SUITE 105
1727 KING STREET
ALEXANDRIA, VIRGINIA 22314-2700
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REMARKS

The Office action of December 17, 2004, has been carefully considered.

Objection has been raised to the disclosure on the basis that there is no brief description of Figure 11 and the title is incorrect.

The specification has now been corrected in the manner suggested in the Office action.

Claims 1 through 4, 6 through 16 and 19 and 20 have been rejected under 35 USC 103(a) over Shannon et al in view of Shiratori et al and further in view of Andrews et al. In addition, Claim 5 has been rejected under 35 USC 103(a) over Shannon et al, Shiratori et al and Andrews et al in further view of Stratton.

It is noted that the claims of record were previously found to be allowable, and Applicants submit that nothing in the newly cited reference to Andrews et al should change this determination.

In the reference to Shannon et al, the applied potential emits electrons between electrodes 14 and 15, which are separated by a semiconductor film 10. These electrodes are laterally spaced, with is different from the geometry of the invention. The applied potential serves only to lower the level of the electrode 15 with respect to electrode 14.

According to the invention, the applied potential is between cathode 2 and anode 3 which is spaced apart from cathode 2 by the vacuum, and the electron emission is controlled by increasing the potential between cathode 2 and anode 3 with the consequence of a deformation of the surface barrier shown in Figure 3 and Figure 4 with the value a_2.

In the Shannon et al patent, the emission of the current comes either from electrons directly from electrode 14 or

electrons from electrode 14 will heat the electrons in N_e in order that they have enough energy to jump over the surface barrier, shown in Figure 3. This is a thermionic phenomenon for electron emission. According to the invention, the field will deform the surface barrier in order that its thickness is small enough to allow a tunneling process of the electrons.

According to Shannon et al, the thickness 10 is not an important parameter. The important parameter is the potential difference between electrodes 14 and 15.

Even if thickness 10 is reduced, because the potential is fixed by electrode 15, the same emission mechanism as the invention cannot be obtained because there is no fixed potential to the surface layer for the anode such as the one placed in front of cathode 2.

According to the invention, it is not obvious that the resulting electron emission mechanism can be obtained by reducing the thickness of the deposited semiconductor layer. The inventors have proposed such a mechanism only after quantum numerical simulations which resulted in the invention. This is not a simple linear deduction which would have been obvious to one of ordinary skill in the art.

The invention of the newly cited Andrews et al reference concerns only the modification of the interface between a metal and a semiconductor layer. This modification by implanting impurities modifies the barrier between the metal and the semiconductor.

According to the invention, the electron emission controlling barrier is the surface potential barrier and not the Schottky barrier 9 which is underneath.

Thus, the invention is structurally different from the device of the cited art, and the result of the invention could not have been predicted based upon the disclosures of the art.

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Withdrawal of these rejections is accordingly requested.

In view of the foregoing amendments and remarks, Applicants submit that the present application is now in condition for allowance. An early allowance of the application with amended claims is earnestly solicited.

Respectfully submitted,

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